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First record of *Pileolaria terebinthi* (*Pucciniales*) in Pakistan

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Abstract—The rust fungus *Pileolaria terebinthi* is recorded for the first time in Pakistan, on *Pistacia chinensis*.

Key words—*Anacardiaceae,* Hazara Division, *Pileolariaceae*, taxonomy, *Uredinales*

Introduction

Rust-infected *Pistacia chinensis* was collected in Haripur District in northern Pakistan. This plant is a small to medium-sized deciduous tree with limited distribution in Pakistan, e.g., the Kurram Valley, Swat, Hazara, Gilgit, Chitral, Muree, Salt range, Peshawar, and Rawalpindi (Pant et al. 2010; Abbasi et al. 2011). Chinese pistachio is traditionally used for treatment of human diseases such as loss of appetite, asthma, coughs, and diarrhea, and leaf galls associated with *Pemphigus* aphids are effective against hepatitis (Bibi et al. 2015).

The rust fungus was determined as a *Pileolaria*. Two *Pileolaria* species, *P. terebinthi* and *P. pistaciae* F.L. Tai & C.T. Wei, have previously been recorded from *P. chinensis* (Teng 1996).

Light microscopy was done on spore mounts embedded in a drop of fixing jelly (glycerine jelly). About 40 randomly chosen spores of each spore state were measured. Our material was identified by uredinial and telial characters as *P. terebinthi*, the first report of this species from Pakistan.

Taxonomy

Pileolaria terebinthi (DC.) Castagne, Observ. Uréd. 1: 22. 1842. Plate 1

Spermogonia and Aecia not found. Uredinia amphigenous on leaves, mostly adaxial, reddish brown; Urediniospores ellipsoid, pyriform or oblong,

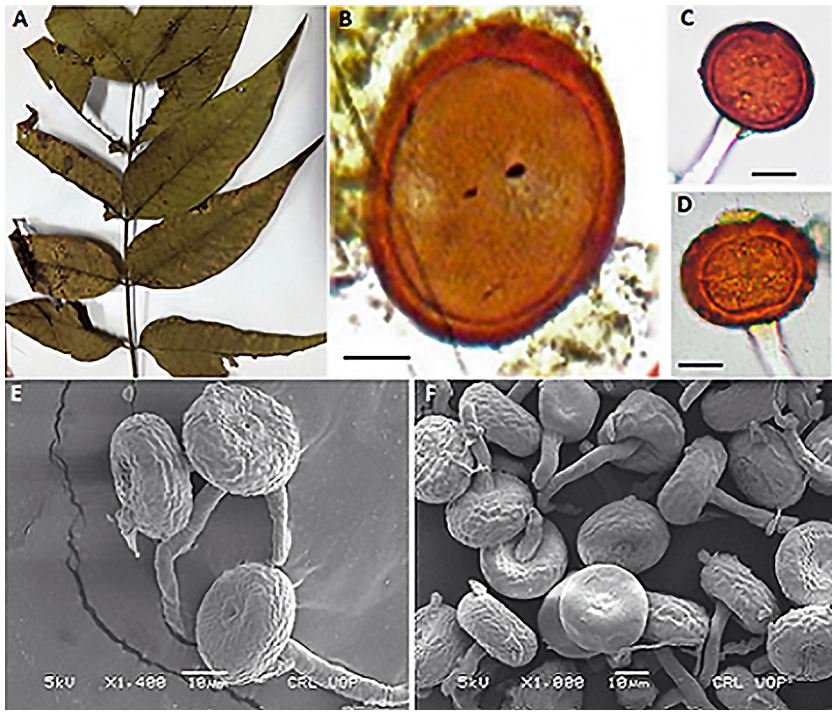

Plate 1: *Pileolaria terebinthi* (ISL–9938). A. *Pistacia chinensis* leaves showing abaxial blackish brown pustules; B. Urediniospore with thick wall; C, D. Teliospores and pedicels; E–F. Teliospores and pedicels (SEM), showing single apical germ pore and rugose surface. Scale bars = 10 µm.

brown to yellowish-brown, pedicellate, verruculose, 26–38 × 18–25 µm; wall densely and minutely verruculose, 3–4 µm thick, thickened up to 6 µm apically, germ pores 4 and equatorial. Telia amphigenous on leaves, mostly adaxial, dark-brown, dusty, rounded, sometimes confluent, 0.5–2.5 × 0.3–1.8 mm in diam; Teliospores chestnut or reddish brown, transversely compressed, unicellular, 20–30 × 27–35 µm in size, wall 3–5 µm thick, rugose, chestnut-brown, with a single apical germ pore, covered by a hyaline or pale papilla measuring 2–5 × 5–11 µm; pedicel 50–190 × 7–12.5 µm, hyaline, thick-walled (1.5–4 µm), smooth, persistent.

Material examined: **PAKISTAN, Khyber Pakhtunkhwa**, Hazara Division, District Haripur, altitude 560 m.a.s.l., on *Pistacia chinensis* Bunge (*Anacardiaceae*), stages II & III, December 2014, leg. B. Ali BA76 (ISL–9938).

Comments: *Pileolaria pistaciae* differs from *P. terebinthi* by its longer (30–46 µm), narrower (15–20 µm), irregularly verrucose, more pointed urediniospores

with thinner walls (1.5–2 µm thick laterally, 4–8 µm thick apically) and by its teliospores having shorter (30–50 µm), narrower (5–7 µm), and roughened pedicels (Hiratsuka et al. 1992; Teng 1996).

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